CLAIMS

1. Use of simple or multiple emulsions comprising in their organic phase one or more extractant compounds capable, when said emulsions are brought into contact with a medium, either biological such as gastric liquid, skin or blood, or artificial such as metal or plastic surfaces, of extracting from said medium specific toxic molecules capable of binding to said extractant or extractants, for the preparation of pharmaceutical compositions intended for the prevention or treatment of intoxications by oral, topical or parenteral route, or for the detoxication of surfaces by simple application to the abovementioned surfaces.

2. Use according to claim 1, of simple water-in-oil, or multiple water-in-oil-in-water emulsions, the internal aqueous phase of which comprises one or more de-extractant compounds, trapping the toxic molecules extracted from the medium.

3. Use according to claim 1 or 2, characterized in that the extractant is chosen from:

– amine derivatives, such as the primary, secondary or tertiary amines or quaternary ammonium salts, comprising one or more carbon chains each comprising approximately 1 to 18 carbon atoms, in particular trioctylamine or trilaurylamine, when the toxic molecule to be eliminated has an acid or anionic character,

– organic acids, such as organophosphorated acids, thiophosphorated acids, carboxylic acids, comprising one or more carbon chains each comprising approximately 1 to 18 carbon atoms, when the toxic molecule to be eliminated has a basic or cationic character,

– solvating molecules, such as alcohols, organophosphates, phosphine oxides, organosulphides or sulphoxides, comprising one or more carbon chains each comprising approximately 1 to 18 carbon atoms, when the toxic molecule to be eliminated has a neutral character.

4. Use according to one of claims 1 to 3, characterized in that the de-extractant is chosen from:

– bases such as NaOH, KOH, Na_2CO_3, when the toxic molecule to be eliminated has an acid or anionic character,

– ionic salts such as NaCl, NH_4Cl or $NaNO_3$, when the toxic molecule to be eliminated has an anionic character,

– acids such as hydrochloric acid or lactic acid, when the toxic molecule to be eliminated has a basic or cationic character,

– compounds which are oxide-reducing or chelating in character, such as chromium (VI) salts, thiourea, ethylene diamine tetracetic acid, chlorinated or fluorinated derivatives, ascorbic acid, when the toxic molecule to be eliminated has a neutral character.

5. Use according to one of claims 1 to 4, of simple water-in-oil emulsions comprising:

– an external organic phase containing:

- one or more extractants, as defined in claim 3, the mass ratio of the extractant or extractants with respect to the organic phase being comprised between approximately 0.1 and approximately 20%,
- one or more lipophilic surfactants with an ether bond, such as the alkyl dimethicone copolyols, or with an amine bond such as long-chain condensed polyamines, or sorbitan or glycol esters, the mass ratio of the lipophilic surfactant or surfactants with respect to the organic phase being comprised between approximately 0.5 and approximately 20%,
- hydrocarbons (qs) such as liquid paraffins, perhydrosqualene or silicones or synthetic esters,

– an internal aqueous phase containing one or more de-extractants as defined in claim 4, and optionally an additive such as an electrolyte or a sugar, the mass ratio of the internal aqueous phase with respect to the emulsion being comprised between approximately 1 and approximately 80%, preferably between approximately 20% and approximately 70%.

6. Use according to one of claims 1 to 4, of multiple water-in-oil-in-water emulsions comprising:

– an external aqueous phase containing one or more hydrophilic surfactants with an ether bond such as ethylene oxide and propylene oxide copolymers, oxyethylenated fatty alcohols, or hydrophilic surfactants with an ester bond such as polyoxyethylenated sorbitan esters, the mass ratio of these surfactants with respect to the external aqueous phase being comprised between approximately 0.1 and approximately 10%,

– an internal simple emulsion as defined in claim 5, comprising:

* an organic phase separating the external aqueous phase above and the internal aqueous phase below, this organic phase containing:

- one or more extractants, as defined in claim 3, the mass ratio of the extractant or extractants with respect to the organic phase being comprised between approximately 0.1 and approximately 20%,
- one or more lipophilic surfactants with an ether bond, such as the alkyl dimethicone copolyols, or with an amine bond such as long-chain condensed polyamines, or sorbitan or glycol esters, the mass ratio of the lipophilic surfactant or surfactants with respect to the organic phase being comprised between approximately 0.5 and approximately 20%,
- hydrocarbons such as liquid paraffins, perhydrosqualene or silicones or synthetic esters,

* an internal aqueous phase containing one or more de-extractants as defined in claim 4,

the external aqueous phase representing approximately 1 to approximately 80% by mass of the simple emulsion, and preferably from approximately 20% to approximately 70%.

7. Use according to one of claims 1 to 6, of simple or multiple emulsions, for the detoxication of acid molecules, such as acetylsalicylic acid, characterized in that the extractant is a tertiary amine, in particular trioctylamine or trilaurylamine, and in that the de-extractant is soda NaOH.

8. Use according to claim 7, of simple water-in-oil emulsions, for the detoxication of acid molecules, such as acetylsalicylic acid, comprising:

– an external organic phase containing:

- liquid paraffin,
- trilaurylamine as extractant, at a rate of approximately 0.1% to approximately 3% by mass with respect to the external organic phase,
- cetyl dimethicone copolyol as lipophilic surfactant, at a rate of approximately 1 to approximately 10% by mass with respect to the external organic phase,

– an internal aqueous phase containing, as de-extractant, soda, at a concentration such that the pH is greater than or equal to 13,

the mass ratio between the aqueous phase and the total emulsion being comprised between approximately 10% and approximately 70%, and preferably equal to approximately 50%.

9. Use according to claim 7, of multiple water-in-oil-in-water emulsions, for the detoxication of acid molecules, such as acetylsalicylic acid, comprising:

– an external aqueous phase containing an ethylene oxide and propylene oxide copolymer as hydrophilic surfactant, at a rate of approximately 0.5 to approximately 2% by mass with respect to the total mass of the external aqueous phase,

– an organic phase separating the external aqueous phase above and the internal aqueous phase below, and containing:

- liquid paraffin,
- trilaurylamine as extractant, at a rate of approximately 0.1% to approximately 3% by mass with respect to the total mass of the organic phase,
- cetyl dimethicone copolyol as lipophilic surfactant, at a rate of approximately 1 to approximately 10% by mass with respect to the total mass of the organic phase,

– an internal aqueous phase containing, as de-extractant, soda, at a concentration such that the pH is greater than or equal to 13, and magnesium sulphate, at a rate of approximately 2 to approximately 6% by mass with respect to the total mass of the internal aqueous phase,

the mass ratio between the internal aqueous phase and the organic phase being comprised between approximately 25% and approximately 200%, and preferably equal to approximately 100%, and the mass ratio between the external aqueous phase and the primary simple emulsion being comprised between approximately 10% and approximately 90%, and preferably equal to approximately 25%.

10. Use according to one of claims 1 to 6, of simple or multiple emulsions, for the detoxication of compounds with a very slightly marked acid-basic character, such as paracetamol, characterized in that the extractant used is a long-chain alcohol, in particular octanol, and in that the de-extractant is NaOH.

11. Use according to claim 10, of simple water-in-oil emulsions comprising:

– an external organic phase containing:

- liquid paraffin,
- octanol as extractant, at a rate of approximately 0.1% to approximately 20% by mass with respect to the external organic phase,
- a condensed polyamine on succinic acid substituted by a polyisobutene chain, such as ECA 4360, as lipophilic surfactant, at a rate of approximately 1 to approximately 10% by mass with respect to the external organic phase,

– an internal aqueous phase containing, as de-extractant, soda at a concentration such that the pH is greater than 13,

the mass ratio between the aqueous phase and the total emulsion being comprised between approximately 10% and approximately 70%, and preferably equal to approximately 50%.

12. Use according to one of claims 1 to 6, of simple or multiple emulsions, for the detoxication of compounds such as zopiclone, characterized in that the extractant used is a long-chain organothiophosphorated acid, in particular di-ethylhexyl-monothiophosphinic acid (Cyanex 302), and in that the de-extractant is hydrochloric acid.

13. Use according to claim 12, of simple water-in-oil emulsions comprising:

– an external organic phase containing:

- liquid paraffin,
- Cyanex 302 as extractant, at a rate of approximately 0.1% to approximately 5% by mass with respect to the external organic phase,
- ECA 4360 as lipophilic surfactant, at a rate of approximately 1 to approximately 10% by mass with respect to the organic phase,

– an internal aqueous phase containing hydrochloric acid at a concentration higher than 0.2 $mol.L^{-1}$, as de-extractant,

the mass ratio between the aqueous phase and the total emulsion being comprised between approximately 10% and approximately 70%, and preferably equal to approximately 50%.

14. Pharmaceutical composition characterized in that it comprises a simple or multiple emulsion as defined in one of claims 1 to 13, if appropriate in combination with a pharmaceutically acceptable vehicle.

15. Pharmaceutical composition according to claim 14, characterized in that it is presented in a form being able to be administered by oral route, in a single or repeated dose, in particular of approximately 10 to approximately 500 g.

16. Pharmaceutical composition according to claim 14, characterized in that it is presented in a form being able to be administered by topical route, in particular at a dose of approximately 2 to approximately 50 mg/cm^2 of skin.

17. Pharmaceutical composition according to claim 14, characterized in that it is presented in a form being able to be administered by parenteral route by extracorporeal circulation, in particular at a dose of approximately 500 to approximately 1000 g.

18. Multiple water-in-oil-in-water emulsion comprising in its organic phase one or more extractant compounds as defined in claim 1 or 3.

19. Multiple emulsion according to claim 18, comprising in its organic phase one or more lipophilic surfactants as defined in claim 6.

20. Multiple emulsion according to claim 18 or 19, comprising in its internal aqueous phase one or more de-extractant compounds as defined in claim 4 or 6, and optional additives such as electrolytes or sugars.

21. Multiple emulsion according to one of claims 18 to 20, comprising in its external aqueous phase one or more hydrophilic surfactants as defined in claim 9.

22. Multiple water-in-oil-in-water emulsion according to one of claims 18 to 21, comprising:

– an external aqueous phase containing one or more hydrophilic surfactants with an ether bond such as ethylene oxide and propylene oxide copolymers, oxyethylenated fatty alcohols, or hydrophilic surfactants with an ester bond such as polyoxyethylenated sorbitan esters, the mass ratio of these surfactants with respect to the external aqueous phase being comprised between approximately 0.1 and approximately 10%.

– an internal simple emulsion comprising:

* an organic phase separating the external aqueous phase above and the internal aqueous phase below, this organic phase containing:

- one or more extractants, as defined in claim 3, the mass ratio of the extractant or extractants with respect to the organic phase being comprised between approximately 0.1 and approximately 20%,
- one or more lipophilic surfactants with an ether bond, such as the alkyl dimethicone copolyols, or with an amine bond such as long-chain condensed polyamines, or sorbitan or glycol esters, the mass ratio of the lipophilic surfactant or surfactants with respect to the organic phase being comprised between approximately 0.5 and approximately 20%,
- hydrocarbons such as liquid paraffins, perhydrosqualene or silicones or synthetic esters,

* an internal aqueous phase containing one or more de-extractants as defined in claim 6,

the external aqueous phase representing approximately 1 to approximately 80% by mass of the simple emulsion, and preferably from approximately 10% to approximately 70%.

23. Multiple emulsion according to one of claims 18 to 22, for the detoxication of acid molecules, such as acetylsalicylic acid, comprising:

– an external aqueous phase containing an ethylene oxide and propylene oxide copolymer as hydrophilic surfactant, at a rate of approximately 0.5 to approximately 2% by mass with respect to the total mass of the external aqueous phase,

– an organic phase separating the external aqueous phase above and the internal aqueous phase below, and containing:

- liquid paraffin,
- trilaurylamine as extractant, at a rate of approximately 0.1% to approximately 3% by mass with respect to the total mass of the organic phase,
- cetyl dimethicone copolyol as lipophilic surfactant, at a rate of approximately 1 to approximately 10% by mass with respect to the total mass of the organic phase,

– an internal aqueous phase containing as de-extractant soda, at a concentration such that the pH is greater than or equal to 13, and magnesium sulphate, at a rate of approximately 2 to approximately 6% by mass with respect to the total mass of the internal aqueous phase,

the mass ratio between the internal aqueous phase and the organic phase being comprised between approximately 25% and approximately 200%, and preferably equal to approximately 100%, and the mass ratio between the external aqueous phase and the primary simple emulsion being comprised between approximately 10% and approximately 90%, and preferably equal to approximately 25%.